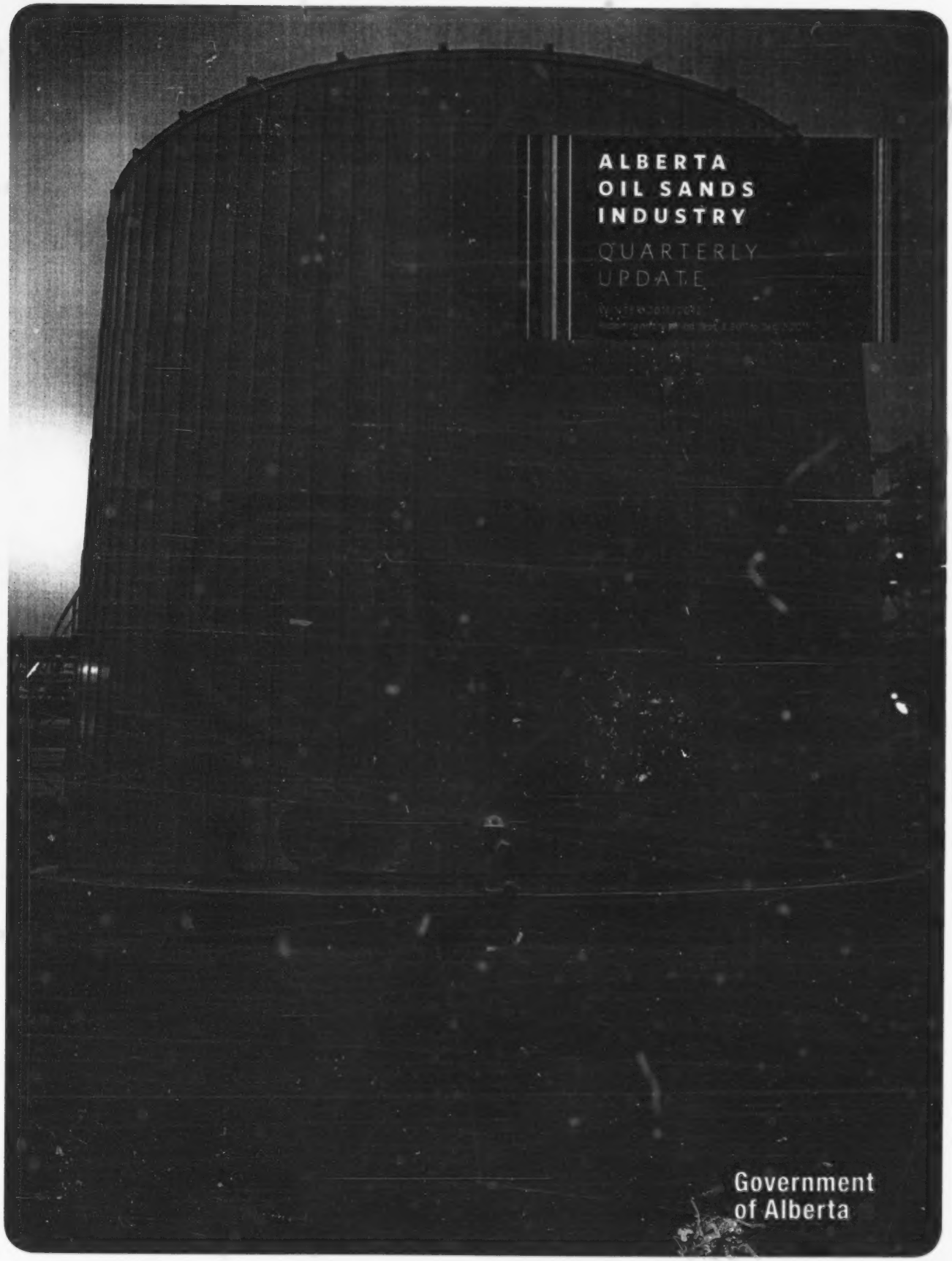
ALBERTA
OIL SANDS
INDUSTRY
QUARTERLY
UPDATE
Government
of Alberta

All about the oil sands

Background of an important global resource

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All photos © 2012, JuneWarren-Nickle's Energy Group

Canada has the third-largest oil reserves in the world, next to Saudi Arabia and Venezuela. Of Canada's 179 billion barrels of oil reserves, 170 billion barrels are located in Alberta, and have the special quality of being bitumen. This is a resource that has been developed for decades but is only now coming into the forefront of the global energy industry, as conventional supplies—so-called "easy" oil—continue to be depleted. The figure of 170 billion barrels represents what is considered economically recoverable with today's technology, but with new technologies, this reserve estimate could be increased to as much as 315 billion barrels.

There are three major bitumen (or oil sands) deposits in Alberta. The largest is the Athabasca deposit, located in the province's northeast in the Regional Municipality of Wood Buffalo. The main population centre of the Athabasca deposit is the City of Fort McMurray. The second-largest oil sands deposit is referred to as Cold Lake, just south of Athabasca, with the main population centre the City of Cold Lake. The smallest oil sands deposit is known as Peace River, which is located in northwest central Alberta. A fourth deposit called Wabasca links to the Athabasca and is generally lumped in with that area.

The existence of bitumen in Alberta has been known for a long time. The first mention of it in Canadian history was in 1719, when a Cree named Wapasu brought a sample of the "gum" to a Hudson's Bay trading post. First Nations in what is now the Wood Buffalo area had traditionally used the bitumen, which seeps from outcrops along the Athabasca River, to waterproof their canoes.

Today bitumen is produced as an energy source by two means—mining and in situ. The majority of oil sands production is done by surface mining, but this will likely change in the future, as 80 per cent of Alberta's bitumen deposits are too deep underground to economically employ this technology.

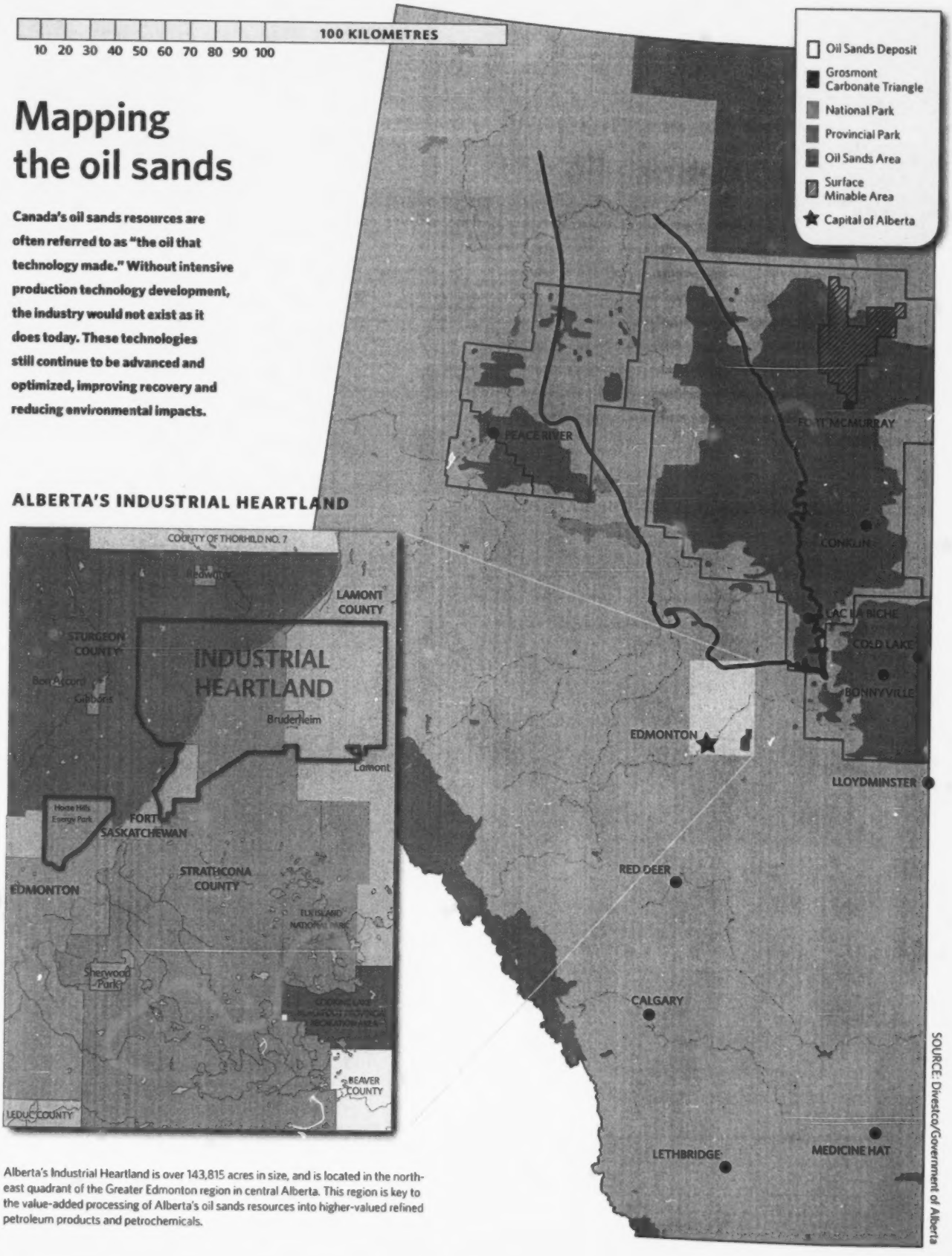
Right now there are essentially two commercial methods of in situ (Latin for "in place," essentially meaning wells are used rather than trucks and shovels). In cyclic steam stimulation (CSS), high-pressure steam is injected into directional wells drilled from pads for a period of time, then the steam is left to soak in the reservoir for a period, melting the bitumen, and then the same wells are switched into production mode, bringing the bitumen to the surface.

In steam assisted gravity drainage (SAGD), parallel horizontal well pairs are drilled from well pads at the surface. One is drilled near the top of the target reservoir, while the other is drilled near its bottom. Steam is injected into the top well, a steam chamber forms, and via gravity, the melted bitumen flows into the lower well and is pumped to the surface using artificial lift.

Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the in situ technology of choice in the Athabasca deposit. The choice is based on a number of things including geology. The technologies combined currently produce just over one million barrels per day.

Research is underway on a number of other production technologies designed to optimize production including variations on solvent-assisted SAGD and CSS, recovery using electricity, and in situ combustion.

Bitumen that has not been processed, or "upgraded," can be used directly as asphalt. It must be diluted to travel by pipeline. Adding value, some producers upgrade their product into synthetic crude oil (SCO), which is a refinery feedstock. At these refineries it can be transformed into transportation fuels and other products. ■



Mapping the oil sands

Canada's oil sands resources are often referred to as "the oil that technology made." Without intensive production technology development, the industry would not exist as it does today. These technologies still continue to be advanced and optimized, improving recovery and reducing environmental impacts.

Alberta's Industrial Heartland is over 143,815 acres in size, and is located in the north-east quadrant of the Greater Edmonton region in central Alberta. This region is key to the value-added processing of Alberta's oil sands resources into higher-valued refined petroleum products and petrochemicals.

SOURCE: Divestco/Government of Alberta

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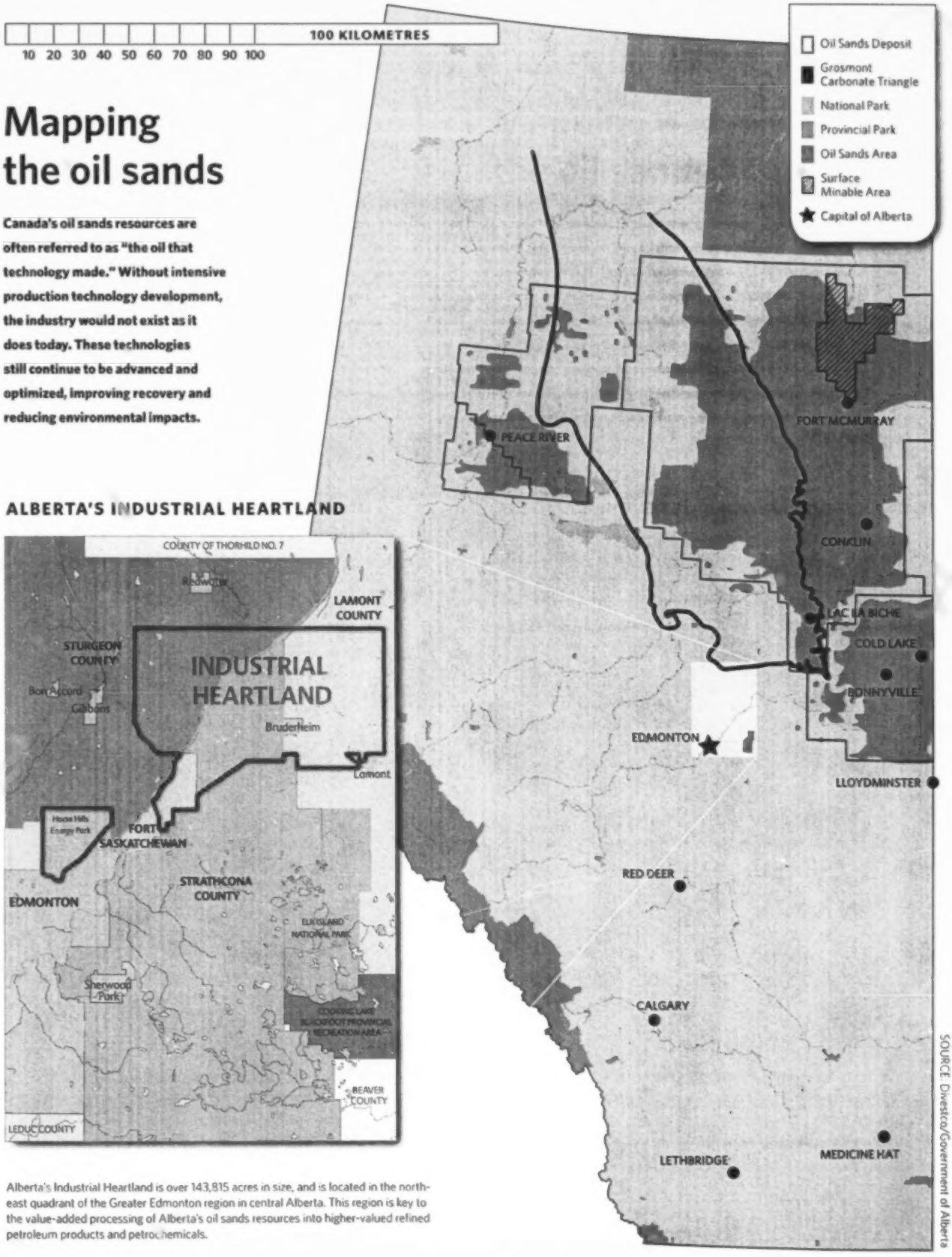

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SOURCE: Divestco/Government of Alberta

Government update

NEW CABINET TEAM FOCUSED ON ALBERTANS'S PRIORITIES

In October, Premier Alison Redford named a new provincial cabinet. "This cabinet reflects what change looks like. It's a team that's committed to listening to Albertans and getting to work right away on bringing the change Albertans want and expect," Redford said.

The new cabinet is committed to serve Albertans in a renewed government structure. The newly created Ministry of Human Services brings together programming for children and families in need. Aboriginal relations and immigration moved to Intergovernmental, International and Aboriginal Relations to better coordinate federal and Aboriginal portfolios. The function of economic development for the province was moved to Treasury Board and Enterprise. The Ministry of Environment and Water emphasizes the importance of protecting one of Alberta's greatest resources.

For the government news release announcing the cabinet structure with the list of the new ministers and committee members, please visit alberta.ca/NewsFrame.cfm?ReleaseID=/acn/201110/31365F8B1C3DE-99E3-570E-0FA956FC8C5B45FF.html.

NEW PORTAL ALLOWS EASY EXTRACTION OF OIL SANDS DATA

A new, one-stop web portal makes it easy to find detailed information on the environmental performance of Alberta's oil sands facilities.

The Oil Sands Information Portal includes searchable data highlighting such things as facility-specific water use, greenhouse gas emissions, tailings pond size, and land disturbance and reclamation. The portal is part of Alberta's ongoing work to make oil sands information more open and transparent, and is the culmination of three years' work to compile data and information from a variety of sources.

In addition to facility data, the Oil Sands Information Portal includes an interactive map with real-time regional air-quality information and river-flow data. It also provides a downloadable data library with easy access to environmental impact assessments, water approvals and licences, and compliance reporting. An integrated data portal supports the Government of Alberta's move towards cumulative effects management.

Visit the Oil Sands Information Portal at osip.alberta.ca.

PREMIER RESPONDS TO KEYSTONE XL DELAY

Premier Alison Redford issued the following statement in response to the U.S. State Department's decision to delay the Keystone XL pipeline and seek a new route.

"It is disappointing that after more than three years of exhaustive analysis and consultation on this critical project, we find out that a decision will be delayed until early 2013. Our position has always been clear that we respect and understand that approval of the pipeline is a U.S. domestic matter, but the fact remains that Keystone XL is a key piece of infrastructure for our province. I sincerely hope that the State Department made this decision based on science and evidence and not rhetoric and hyperbole from very well-organized interest groups.

"Alberta is steadfastly committed to this project, and my government will continue to advocate that we are the safest, most secure and responsible source of oil for the United States. I will seek immediate answers from U.S. officials to determine why this decision was made and how the process will unfold going forward.

"Alberta is an export-based economy and [this] decision is a clear reminder about the strategic importance of diversifying our export markets. Our energy industry supports this province and our country, and it is imperative that we can move our products to market."

EUROPEAN LEGISLATORS VISIT THE OIL SANDS

Ten members of a European delegation recently spent a day visiting the Athabasca oil sands region.

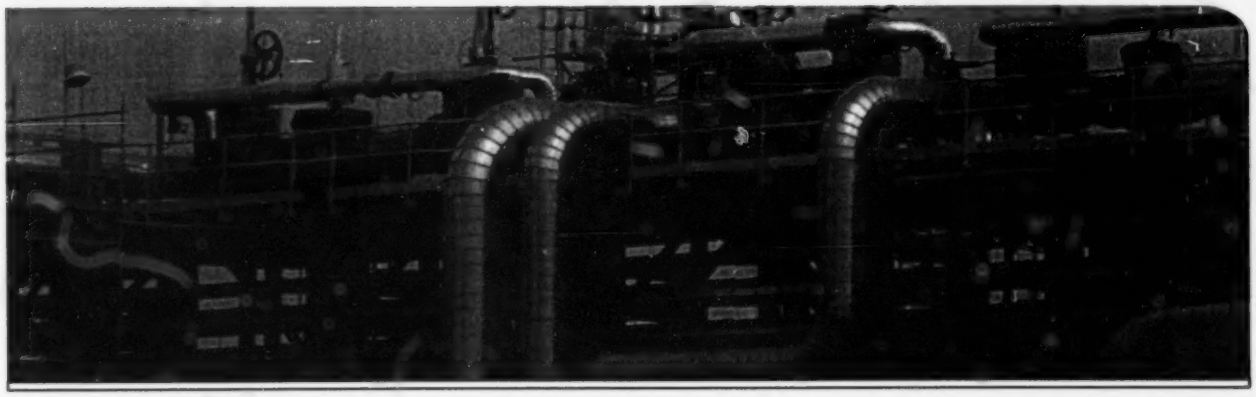
The delegation included members of the European Parliament from Hungary, Ireland, Luxembourg and Poland, and was part of a mission organized by the European Energy Forum.

It was the second European Union delegation and repeated the success Alberta has consistently had with allowing policy and decision makers to see the reality of the oil sands first-hand.

"We learned a lot, that's the most important thing in helping us make decisions," says Edit Herczog, of Hungary.

ERCB ANNOUNCES CHANGES TO WELL SPACING FRAMEWORK

The Energy Resources Conservation Board (ERCB) recently issued *Bulletin 2011-29*, which advises of regulation amendments to change its well-spacing framework for



conventional and unconventional oil and gas reservoirs. The changes allow for enhanced conservation of Alberta's oil and gas resources by enabling companies to optimize resource recovery in a safe, efficient and responsible manner that maximizes the benefit of the resources for all Albertans.

Well spacing relates primarily to the subsurface aspects of reservoir development and does not impact the rights of landowners with respect to surface development. ERCB requirements for development of all surface facilities, such as wells and pipelines, which include public notification requirements and allow landowners to participate in ERCB processes, remain unchanged.

Effective immediately, the ERCB has made four changes to its well-spacing framework:

- Subsurface well-density controls for coalbed methane and shale gas have been removed across Alberta and in certain gas zones in southeastern Alberta.
- Baseline well densities have been increased from one well to two wells per pool per standard drilling spacing unit province-wide for conventional gas reservoirs.
- Centralized target areas for drilling spacing units will be standard throughout Alberta, with the exception of a specific area in southeastern Alberta where corner target areas will be standard for gas reservoirs only.
- Regulation amendments have been implemented that decrease the complexity of the current spacing framework.

NEB RELEASES THE REPORT *CANADA'S ENERGY FUTURE: ENERGY SUPPLY AND DEMAND PROJECTS TO2035*

In November, the National Energy Board (NEB) released a report titled *Canada's Energy Future: Energy Supply and Demand Projects to2035*. The report examines energy trends in Canada and provides a view of energy supply to 2035.

To gather information for the report, NEB held cross-Canada consultations last spring to seek the views of Canadian energy experts and other interested stakeholders, and then conducted its own extensive quantitative analysis.

Among key findings in the report, based on a moderate "mostly likely" view of future energy prices and economic growth, are:

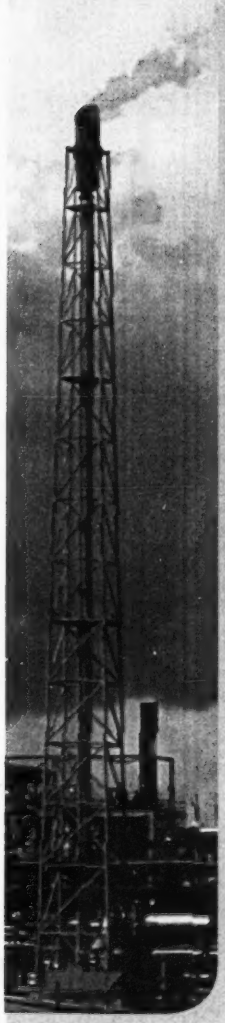
- Although energy from fossil fuels will remain the dominant source of supply during the forecast period, emerging fuels and technologies will gain market share as policies and programs promote growth in these areas. The share of biofuels in transportation-sector energy consumption will triple over the projection period, from 1.1 per cent to 3.3 per cent in 2035, while the share of renewable-based electricity generation will increase from 62 per cent to 67 per cent in 2035.
- Energy supply will grow to record levels fuelled by the emergence of unconventional production such as oil sands, shale gas and tight gas, and—in the area of power production—construction of new generating capacity to meet steadily increasing demand.
- Total end-use energy demand growth will slow to 1.3 per cent during the projection period, down from 1.4 per cent from 1990 to 2008. Factors reducing demand include slowing population growth, higher energy prices, lower economic growth, and enhanced efficiency and conservation programs. While demand will slow considerably in the residential, commercial and transportation sectors, it will be partially offset by industrial-sector demand growth. The industrial sector accounted for almost half of Canadian energy demand in 2010.
- Net crude oil available for export will more than triple by 2035, and net electricity available for export will double in that period. The amount of natural gas available for export is expected to gradually decline until 2020 due to increased Canadian demand for natural gas. After 2020, production growth and demand growth will be about the same.

The document also outlines four additional cases based on high and low energy prices, and fast and slow economic growth.

To view the report and detailed data used to develop it, visit the Energy Reports section on the main page of the NEB website at neb-one.gc.ca. ■

What's new in the oil sands

Key updates from winter 11/12



■ Jacobs Engineering Group Inc. has announced new contracts in the fourth quarter of fiscal 2011 from seven clients in the Alberta oil sands to support steam assisted gravity drainage (SAGD) and bitumen upgrading expansion projects. Officials estimate the combined total construction value of the awarded projects at more than $1.4 billion.

Project scopes include engineering procurement and construction, front-end engineering and design, and fabrication and construction management on a variety of mid- and large-cap projects. The construction values on each project range in value from $15 million to more than $650 million. Due to the competitive nature of the projects and strict client confidentiality, Jacobs is unable to provide specific details.

■ Xplornet Communications Inc. announced in mid-October the successful completion of a 4G satellite ground station located near Fort McMurray, Alta. The investment, described as "multi-million-dollar" and "cutting-edge," is designed to provide a high-speed link to the Internet for a next generation, or 4G, high-throughput satellite, ViaSat-1, that will supply broadband for rural Canadians across the country.

"Satellite is the key to unlocking access to real broadband for rural Canadians," the company says. "Ground stations like the one near Fort McMurray provide the terrestrial link for the high-capacity signal the satellites will receive and transmit."

■ Rental power, temperature control and oil-free compressed-air technology provider Aggreko is continuing its expansion into western Canada with the opening of a larger, enhanced service centre in Edmonton. The company opened its first service centre in Edmonton in 2007 and is now tripling the size of its local operations to meet high demand. The new 33,000-square-foot facility includes a larger shop to perform major equipment maintenance, repairs and retrofits locally. In addition, the company has increased its staff of experienced sales and service personnel.

■ Flint Energy Services Ltd. has been selected as the construction contractor for a major SAGD project in the Wood Buffalo Region near Fort McMurray. The contract involves field construction and is valued at approximately $430 million.

The company will be responsible for the construction of two major silos of work within the central plant facility. The scope of the project consists of Flint's traditional mechanical and electrical direct field activities, as well as construction management and support.

Flint's work will begin in the first quarter of 2012 and will continue until mid-2014. The company anticipates the project will employ over 1,500 people at peak.

■ Petrobank Energy and Resources Ltd. reports that the Energy Resources Conservation Board has scheduled a hearing for March 6, 2012, regarding its May River Phase 1 application, a proposed 10,000-barrel-per-day commercialization of toe to heel air injection. Consultation efforts with the two parties that have filed valid statements of concern continue in an ongoing attempt to clarify and resolve outstanding issues prior to the hearing.

Petrobank also announced it has suspended air injection at the Conklin, Alta., demonstration project after completing its wet combustion test. It has completed all of its near-term testing operations scheduled for Conklin, and it will now suspend the facility until it finalizes plans to either integrate it into the larger May River operations or abandon the site. The company says that suspension of the Conklin operations will not impact the May River development plans.

■ Oil sands heavyweights Suncor Energy Inc. and Cenovus Energy Inc. have both been rated in the top 10 per cent of companies listed in the Carbon Disclosure Project (CDP), which recognizes excellence in climate change disclosure. The firms were ranked according to the quality and comprehensiveness of their disclosure to CDP, with Suncor ranking number one and Cenovus ranking number eight out of 200.

"Companies that make the Carbon Disclosure Leadership Index have demonstrated good internal data management practices for understanding greenhouse gas emissions," says Paul Simpson, CDP chief executive officer. "Those organizations that give clear consideration to measuring and reporting on climate change issues will be best placed to capitalize on the opportunities from managing them."

Each year, CDP requests information from 200 of the largest corporations in Canada by market capitalization. In 2011, this request was sent on behalf of 551 institutional investors with more than US$71 trillion in assets.

■ The second annual Alberta Energy Challenge is complete, and a team from the University of Alberta took top honours for its detailed answer to the simplified question, "What is your vision of our energy future, and what is the corporate strategy that will position Suncor to compete in it?"

Alberta Energy Challenge chair Stephanie Stiles says that 12 teams from across North America participated. All were asked to research and develop a scenario of the global energy picture between now and 2050, emphasizing the importance of the "triple bottom line" and where Suncor's strategy should fit within that picture.

"The winner was fairly status quo," Stiles explains, adding that the judges—including representatives from Suncor and Cenovus—were not looking for flattery. "They were essentially looking for someone to come out and say 'no, we think we should do this,' but be able to defend their strategies, and tell them why they should fully invest in a different technology or completely change their business plans. [One group] kind of did, but they weren't able to defend themselves."

■ Ziff Energy Group expects natural gas consumption in the Alberta oil sands will grow to about three billion cubic feet per day in 2020, up from about 1.1 billion cubic feet per day currently. Ziff analysts examined more than 60 existing, under construction, approved and proposed oil sands developments, using this information to forecast growth in gas demand through this decade.

"Gas demand for the oil sands sector will account for four per cent of the total North American gas demand in 2020," says analyst Julia Sagidova. That would be up from an estimate of roughly 1.5 per cent of North America's average gas demand today.

■ Osum Oil Sands Corp. will use water treatment technologies from Veolia Water Solutions & Technologies to process produced water from its Taiga SAGD project at Cold Lake, Alta. De-oiled produced water will be treated using Veolia evaporators, providing water to the once-through steam generators. The system will also treat the resulting blowdown.

"The evaporator system will recover over 93 per cent of the water from SAGD operations for reuse in the process," says Veolia. "More importantly, Osum will use no fresh water in the extraction process, instead using high-salinity water for makeup deman[4] for steam generation." The Taiga project is expected to commence operations in 2013.

■ North American Energy Partners Inc. (NAEP) has been awarded a $127-million heavy civil construction contract with Fluor Canada Limited at Syncrude Canada Ltd.'s Base Mine.

The new contract at Syncrude is the first of several large construction contracts to be let relating to the mine train relocations at Syncrude's Base and Aurora Mines. NAEP completed the preliminary earthworks related to this project in the spring of 2011.

■ Enbridge Inc. plans to twin the southern section of its Athabasca Pipeline from Kirby Lake to the Hardisty crude oil hub at an estimated cost of approximately $1.2 billion to accommodate the need for additional capacity to serve Kirby-area oil sands growth.

The twin line will initially add approximately 450,000 barrels per day of capacity between these points, with low-cost expansion potential to 800,000 barrels per day. The line is expected to be capable of accepting initial volumes by early 2015, with its full initial capacity available by 2016.

■ Laricina Energy Ltd. says that SAGD continues to work well at its pioneering pilot in the bitumen-bearing Grosmont carbonate formation at Saleski.

No defined-commercial bitumen has yet been produced from Alberta's carbonate rock, which may hold enough in-place oil to rival the conventional oil sands. Several cyclic steam pilots produced mixed results some years ago, but Laricina is the first to test SAGD.

Steam injection at Saleski began last December 23. In the second quarter, Laricina began selling bitumen produced from the pilot and says it will continue to ramp up production through the rest of 2011. ➤

What's new in the oil sands *continued*

Following an operating period with steam alone to validate longer-term conventional SAGD performance, the second stage of solvent-cyclic SAGD will begin in the first well pair.

■ Connacher Oil and Gas Limited has announced that it has engaged Rothschild Group as its exclusive financial adviser solely for the purpose of assisting the company in establishing a joint venture with a third party to develop its non-producing Great Divide oil sands assets.

The initial focus of the joint venture will be to advance the proposed development of an additional 24,000 barrels per day of bitumen productive capacity at Connacher's Algar SAGD project on the company's Great Divide oil sands acreage in northeastern Alberta.

■ Grizzly Oil Sands ULC has awarded a $4-million-plus order to Rockwell Automation. The company will use a proprietary process automation system to help Grizzly produce more than 5,000 barrels of oil per day at the first phase of its Algar Lake SAGD project.

Grizzly has developed a unique facilities model that it calls Advanced Relocatable Modular Standard development, to reduce costs, risks and environmental footprint. "For our unique Grizzly facility model, we needed an advanced, integrated process and motor control system that would monitor multiple SAGD sites from one central location, now and as we expand," says Brian Harrison, Grizzly's vice-president of engineering.

A shadow control room, built on a virtualized computing environment, will be developed at Grizzly's Calgary headquarters to monitor and control current and future oil sites across northern Alberta. Harrison says, "This unique, open architecture is an important reason Rockwell Automation won the order."

■ By the end of 2011, Cenovus expects to have lined up a partner for a portion of its Borealis-region oil sands property, which includes its 100 per cent-owned Telephone Lake project, says the company's top official.

Cenovus has retained two financial advisers, RBC Capital Markets and Barclays Capital, says Brian Ferguson, president and chief executive officer. "It's going to be a world-class opportunity that we are taking to market in terms of the size and scale."

As the company is planning on a competitive process, it is quite open-minded about what form the deal might take. "We will wait to see what that process generates in terms of ideas and opportunities for Cenovus shareholders," Ferguson adds.

In the fourth quarter of this year, Cenovus plans to file a revised application for Telephone Lake, updating the initial 35,000-barrel-per-day application to 90,000 barrels per day.

■ IMV Projects has been awarded a two-year frame agreement by Shell Canada Energy to provide engineering, procurement and project management services to Shell's upstream oil and gas projects in western Canada.

IMV Projects has worked for Shell since 2004, executing a variety of new projects in western Canada and offshore Alaska, including the project management, engineering, procurement and construction management of the grassroots 20,000-barrel-per-day Orion SAGD facility near Cold Lake.

The companies did not disclose what specific projects IMV will be working on.

■ Paramount Resources Ltd. has received an updated evaluation of its 100 per cent-owned in situ oil sands leases covering approximately 56 contiguous sections in the Hoole area of Alberta, situated within the western portion of the Athabasca region.

The updated evaluation was conducted by McDaniel & Associates Consultants Ltd., who estimated that the Hoole properties contain approximately 762.66 million barrels of economic contingent bitumen resources within the Grand Rapids formation. Based on the new assessment, the project's fully developed production capability, on a best-estimate basis, is 80,000 barrels per day. Estimates of production rates assume that production will begin in 2015 and fully developed production will be reached in 2017 for the best estimate.

During the remainder of 2011, the company expects to finalize its plans for the initial development at Hoole and complete the engineering design and environmental impact analysis for the project with a view to submitting a regulatory application for commercial development of the resource by the end of 2011. ■

TECHNOLOGY LEGEND

COGD	Combustion overhead gravity drainage
CSS	Cyclic steam stimulation
ET-DSP	Electro-thermal dynamic stripping process
N-SOLV	Heated solvent vapour extraction
SAGD	Steam assisted gravity drainage
THAI	Toe to heel air injection

Project listings

Updated status of oil sands projects in Alberta

As of Dec. 2, 2011.

NORTH ATHABASCA REGION — MINING				
BITUMEN PRODUCTION CAPACITY				
CANADIAN NATURAL RESOURCES LIMITED				
Horizon (Synthetic crude oil production capacity)				
Phase 1	135,000	[illegible]	Operating	Mining
Tranche 1	—	2007	Complete	Engineering/Design
Tranche 2	5,000	2012	Construction	Mining
Phase 2A	10,000	2014	Approved	Mining
Phase 2B	45,000	2018	Approved	Mining
Phase 3	80,000	2021	Approved	Mining
IMPERIAL OIL LIMITED				
Kearl				
Phase 1	110,000	[illegible]	Construction	Mining
Phase 2	235,000	TBD	Approved	Mining
SHELL ALBIAN SANDS				
Jackpine				
Expansion	100,000	[illegible]	Approved	Mining
Phase 1A	100,000	2010	Operating	Mining
Phase 1B	100,000	TBD	Approved	Mining
Muskeg River				
Commercial	155,000	2002	Operating	Mining
Expansion & Debottlenecking	115,000	TBD	Approved	Mining
Pierre River				
Phase 1	100,000	TBD	Application	Mining
Phase 2	100,000	TBD	Application	Mining
SILVERBIRCH ENERGY CORPORATION*				
Frontier				
Phase 1	80,000	[illegible]	Application	Mining
Phase 2	80,000	TBD	Application	Mining
Phase 3	80,000	TBD	Application	Mining
Phase 4 Equinox	40,000	[illegible]	Application	Mining

Canadian Natural says that SCO production safely resumed (post-January upgrader fire) in August, steadily growing to 108,000 barrels per day in October. Commissioning is underway on a third ore preparation plant and associated hydrotransport, expected to increase reliability in 2012.

Imperial Oil says that construction is 79 per cent complete, and is progressing on schedule with start-up targeted for late 2012. In response to delays in obtaining U.S. states' transportation permits for certain modules, Imperial says modules have been reduced in size and permits for additional interstate highway routes have been received. Transport increased in the third quarter and reassembly is underway.

Shell says that the AOSP Expansion 1 has ramped up and is expected to stabilize at plateau rates shortly. The environmental impact assessment for both the Jackpine expansion and Pierre River mines is deemed complete and has been referred to a joint review panel. Partner Marathon Oil says the first phase of a debottlenecking project has been approved and is expected to add 10,000 barrels per day by the fourth quarter of 2012.

Silverbirch said it would file the Frontier and Equinox projects by the end of 2011, and it has. This is the last remaining undeveloped oil sands mining project to enter the regulatory process. Corporate sanction could occur as early as 2014-15, with construction commencing in 2016.

SUNCOR ENERGY INC.				
Base Operations				
Millennium Debottlenecking	23,000	[illegible]	Operating	Mining
Millennium Mine	294,000	Exp.	Operating	Mining
North Steepbank Extension	180,000	2012	Construction	Mining
Steepbank Debottleneck Phase 3	4,000	2011	Operating	Mining
Fort Hills				
Debottleneck	25,000	[illegible]	Approved	Mining
Phase 1	165,000	2018	Approved	Mining
Voyageur South				
Phase 1	120,000	TBD	Application	Mining
SYNCRUDE CANADA LTD.				
Mildred Lake/Aurora North & South				
Aurora South Train 1	100,000	[illegible]	Approved	Mining
Aurora South Train 2	100,000	2018	Approved	Mining
Base Mine Stage 1 & 2 Expansion	290,700	1978	Operating	Mining
Stage 3 Expansion	116,300	2006	Operating	Mining
TOTAL E&P CANADA LTD.				
Joslyn North Mine				
Phase 1	100,000	[illegible]	Approved	Mining
Joslyn South Mine				
Phase 1	100,000	TBD	Announced	Mining
Northern Lights Mine				
Phase 1	57,250	TBD	On Hold	Mining
Phase 2	57,250	[illegible]	On Hold	Mining

Suncor says that during the third quarter it completed construction and initiated commissioning of the hydrogen plant portion of the Millennium Naphtha Unit, and that the hydrotreater portion of the project is expected to be complete before the end of 2011. This project is designed to provide flexibility and boost sweet oil production, helping to maximize profits. Suncor is also in the process of deploying TRO tailings management across its operations, to be completed by the fourth quarter of 2012.

Suncor expects to progress with engineering and site preparation work at the Furt Hills mine, targeting a 2016 start-up. Project still must be sanctioned and does not include upgrader portion.

Canadian Oil Sands reports that front-end engineering and design are now complete for its $4.6-billion Mildred Lake mine train replacements. The target in-service date for the $1.6-billion Syncrude Emissions Reduction Project has now been extendad into the first quarter of 2012.

Project partner Suncor Energy says that current capital expenditures are around geological, engineering, regulatory and environmental studies.

CURRENT PROJECT	CAPACITY	START-UP	APPROVAL STATUS	TECHNOLOGY
NORTH ATHABASCA REGION — IN SITU BITUMEN PRODUCTION CAPACITY				
ATHABASCA OIL SANDS CORP.				
Dover West Clastics				

AOSC reports that it is on track to submit regulatory applications for its Dover West clastics projects before year-end 2011.

Phase 1	12,000		Announced	SAGD
Phase 2	35,000		Announced	SAGD
Phase 3	35,000		Announced	SAGD
Dover West Leduc Carbonate				

AOSC says that TAGD piloting will continue through the end of the first quarter of 2012. Regulatory application for a two-phase demonstration project filed in October.

Phase 1 Demonstration	6,000		Application	SAGD
Phase 2 Demonstration	6,000	TBD	Application	SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Birch Mountain				
Phase 1	60,000	2022	Announced	SAGD
Phase 2	60,000	2024	Announced	SAGD
CENOVUS ENERGY INC.				
Telephone Lake Borealis				

Cenovus expects to submit a revised application increasing Phase A production capacity from 35,000 barrels per day to 90,000 barrels per day in the fourth quarter. The company says it is making progress on its plans for a transaction involving the project, and interested parties are now viewing information about the opportunity.

Phase A	35,000		Application	SAGD
Phase B	15,000	TBD	Announced	SAGD
DOVER OPERATING CORP.				
Dover				
Phase 1	50,000	2020	Application	SAGD
Subsequent Phases	200,000	TBD	Application	SAGD
Mackay River				

Dover OpCo has received internal approval to proceed with the Mackay River field development plan. It is now moving forward with execution plans including reserving a drilling rig, detailed engineering, bidding on long-lead equipment and considering bitumen transportation options.

Phase 1	35,000	2016	Application	SAGD
Phase 2	40,000	2017	Application	SAGD
Phase 3	40,000	2019	Application	SAGD
Phase 4	35,000	TBD	Application	SAGD
E-T ENERGY LTD.				
Poplar Creek				

E-T has announced a deal (undisclosed value) with Total E&P Canada for ongoing testing, as well as $6.86 million in funding from the Climate Change and Emissions Management Corporation. E-T anticipates regulatory approval for its commerical project in 2011.

Phase 1	10,000	2016	Application	ET-DSP
Pilot	1,000	2007	Operating	ET-DSP
HUSKY ENERGY INC.				
Sunrise				

Husky says that approximately half of the 49 planned SAGD well pairs have been drilled, trending on budget and on schedule. Drilling expected to be completed by the second half of 2012. Field facilities engineering contractor has mobilized on site to begin construction on first well pad; the central processing facility contractor has commenced foundation installation; major camp building underway.

Phase 1	60,000	2014	Construction	SAGD
Phase 2	50,000	2016	Approved	SAGD
Phase 3	50,000	TBD	Approved	SAGD
Phase 4	50,000	TBD	Approved	SAGD
IVANHOE ENERGY INC.				
Tamarack				

Ivanhoe says that Alberta regulators have completed their initial review of the project application. Answers to first round of supplemental information requests are being prepared, to be delivered to regulators in the fourth quarter of 2011. Project sanction remains subject to regulatory approval and financing.

Phase 1	20,000	2016	Application	SAGD
Phase 2	20,000	2018	Application	SAGD
MARATHON OIL CORPORATION				
Birchwood				
Pilot	12,000	2012	Announced	
OAK POINT ENERGY LTD.				
Leduc				

Oak Point Energy reports that engineering and procurement is ongoing.

Pilot	1,720	2012	Application	
ROYAL DUTCH SHELL PLC				
Basement				

The project, which would incorporate electrical heaters, has been delayed. Laricina Energy's May purchase of additional leases in the Grosmont carbonate zone included "non-core" portions of Shell Canada's Grosmont acreage.

Pilot	TBD		On Hold	SAGD
SOUTHERN PACIFIC RESOURCE CORP.				
STP McKay				

Southern Pacific says several key pieces of the central processing facility have recently been installed on site including evaporator towers, steam generation boilers, cogen turbines, heat recovery steam generators and components of the pipe rack assembly. Project remains on track for first steam in the second quarter of 2012. Expansion application filed in November 2011.

Phase 1	12,000	2012	Construction	SAGD
Phase 2A	12,000	2015	Application	SAGD
Phase 2B	12,000	TBD	Application	SAGD
SUNCOR ENERGY INC.				
Firebag				

Stage 3 cogen plant is nearing completion. Volumes from Stage 3 are ramping up and expected to boost production in 2012 along with new infill wells. Construction of infrastructure, well pads, and central plant and cogeneration facilities continues on Firebag Stage 4.

Cogeneration and Expansion	25,000	2004	Operating	SAGD
Stage 1	35,000	2004	Operating	SAGD
Stage 2	35,000	2006	Operating	SAGD
Stage 3	62,500	2011	Operating	SAGD
Stage 3-6 Debottleneck	23,000	TBD	Application	SAGD
Stage 4	62,500	2012	Construction	SAGD
Stage 5	62,500	2013	Approved	SAGD
Stage 6	62,500	2015	Approved	SAGD
Lewis				
Phase 1	40,000	TBD	Application	SAGD
Phase 2	40,000	TBD	Application	SAGD
MacKay River				

Suncor says that new wells coming onstream at MacKay River in the fourth quarter of 2011 and the first quarter of 2012 are expected to offset natural declines.

MR2	40,000	2012	Application	SAGD
Phase 1	33,000	2012	Operating	SAGD
SUNSHINE OILSANDS LTD.				
Harper				

Sunshine Oilsands has raised $230 million and secured significant investments, including from China Life Overseas and Bank of China Group. At Harper, it reports it has successfully conducted a single-well CSS test. Results from the test were presented to the ERCB, which subsequently encouraged the company to continue investigation of the formation through extension of its pilot permit.

Carbonate Pilot	1,000		Operating	SAGD
Legend Lake				

Sunshine Oilsands has filed its application for the Legend Lake SAGD project.

Phase 1	10,000		Application	SAGD
Phase 2	10,000	TBD	Announced	SAGD
Phase 2 Expansion	10,000	TBD	Announced	SAGD
Phase 3	20,000	TBD	Announced	SAGD
Phase 3 Expansion	10,000		Announced	SAGD

[illegible]	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Thickwood				
Phase 1	10,000	2015	Application	SAGD
Phase 2	20,000	2017	Announced	SAGD
Phase 2 Expansion	20,000	2020	Announced	SAGD
West Lk.				
Phase 1	5,000	[illegible]	Application	SAGD
Phase 2	5,000	2015	Application	SAGD
Phase 3	40,000	2018	Announced	SAGD
Phase 4	40,000	2024	Announced	SAGD
TOTAL E&P CANADA LTD.				
Joslyn				
Phase 2	10,000	2068	Suspended	SAGD
VALUE CREATION INC.				
Terre de Grace				
Phase 1	40,000	TBD	Announced	SAGD
Phase 2	40,000	TBD	Announced	SAGD
Pilot	10,000	[illegible]	Approved	SAGD

Sunshine Oilsands has submitted the regulatory application for its Thickwood SAGD project, anticipating project start-up in 2015.

Sunshine says that ongoing formal dialogue with regulators indicates that its regulatory application is technically sound and that environmental and stakeholder concerns have been addressed. Approval timing for final permit depends on resolution of gas-over-bitumen hearing. FEED has begun.

SOUTH ATHABASCA REGION — IN SITU
BITUMEN PRODUCTION CAPACITY

[illegible]	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
ALBERTA OILSANDS INC.				
Clearwater West				
Phase 2	25,000	[illegible]	Announced	SAGD
Pilot	4,350	2012	Application	SAGD
ATHABASCA OIL SANDS CORP.				
Hangingstone				
Phase 1	12,000	2015	Application	SAGD
Phase 2	25,000	2016	Announced	SAGD
Phase 3	25,000	2019	Announced	SAGD
Hangingstone East				
Halfway Creek Exploratory Program	10,000	2014	Approved	SAGD
Hangingstone Pilot				
Experimental Combustion Pilot	1,000	TBD	Application	COGD
BLACKPEARL RESOURCES INC.				
Blackrod				
Commercial	80,000	2015	Announced	SAGD
Pilot	500	2011	Operating	SAGD
CANADIAN NATURAL RESOURCES LIMITED				
Gregoire Lake				
Phase 1	60,000	2024	Announced	TBA
Grouse				
Commercial	40,000	2021	Announced	SAGD

Alberta Oilsands anticipates approval for the Clearwater West pilot in 2012 with construction to follow.

During the third quarter of 2011, AOSC acquired additional oilsands leases at Halfway Creek, adjacent to its Hangingstone asset, enabling full economies of scale for the project. AOSC has also replied to the first round of supplemental information requests from regulators. Front-end engineering has commenced with target completion in the first quarter of 2012. Procurement has begun. Internal sanction and regulatory approval anticipated in 2012.

BlackPearl says production at the pilot is now 200 barrels per day and ramping up. FirstEnergy Capital says the BlackRod pilot is performing ahead of its analogs (specifically Canadian Natural Resources Wolf Lake). Commercial project application to be filed in the first quarter of 2012, between 10,000 and 20,000 barrels per day.

Regulatory application is targeted for the first quarter of 2012. Alberta Environment has issued its final terms of reference for the Grouse environmental impact assessment.

[illegible]	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Kirby (North)				
Phase 1	50,000	2015	Application	SAGD
Phase 2	30,000	2020	Announced	SAGD
Kirby (South)				
Phase 1	45,000	2013	Construction	SAGD
Phase 2	15,000	2020	Announced	SAGD
Leismer				
Commercial	30,000	2021	Announced	SAGD
CENOVUS ENERGY INC.				
Christina Lake				
Phase 1A	10,000	2007	Operating	SAGD
Phase 1B	8,800	2009	Operating	SAGD
Phase C	40,000	2011	Operating	SAGD
Phase D	40,000	2013	Construction	SAGD
Phase E	40,000	2016	Approved	SAGD
Phase F	40,000	2016	Approved	SAGD
Phase G	40,000	2018	Approved	SAGD
Phase H	40,000	2018	Announced	SAGD
Foster Creek				
Phase A	24,000	1997	Operating	SAGD
Phase B Debottleneck	6,000	2007	Operating	SAGD
Phase C Stage 1	10,000	2007	Operating	SAGD
Phase C Stage 2	20,000	2007	Operating	SAGD
Phase D	30,000	2009	Operating	SAGD
Phase E	30,000	2009	Operating	SAGD
Phase F	35,000	2016	Construction	SAGD
Phase G	35,000	2017	Approved	SAGD
Phase H	35,000	2018	Approved	SAGD
Phase I	45,000	2021	Announced	SAGD
Grand Rapids				
Phase A	60,000	2015	Application	SAGD
Phase B	60,000	TBD	Announced	SAGD
Phase C	60,000	TBD	Announced	SAGD
Pilot	600	2010	Operating	SAGD
Narrows Lake				
Phase 1	43,333	2015	Application	SAGD
Phase 2	43,333	TBD	Application	SAGD
Phase 3	43,334	TBD	Application	SAGD
CONNACHER OIL AND GAS LIMITED				
Great Divide				
Algar Pod 2	10,000	2007	Operating	SAGD
Expansion	24,000	2014	Application	SAGD
Pod 1	10,000	2006	Operating	SAGD

Canadian Natural is targeting a regulatory application for Phase 1 in the fourth quarter. Alberta Environment has issued its final terms of reference for both phases of the project.

Canadian Natural says construction remains on track and on budget. Drilling is complete on the first of seven pads and has commenced on the second, expected to be finished by the end of 2011. Total project was 29 per cent complete at the end of the third quarter.

Construction of Phase D is 65 per cent complete, Cenovus reports, ahead of schedule and on budget. Construction has started on Phase E and earthworks is underway for Phase F.

Earthworks is nearing completion for Phases F-H. Detailed engineering, the installation of metal pilings and the pouring of concrete continue. Several pipe and equipment rack modules for Phase F are currently being assembled at Cenovus' Nisku yard, with the first one already delivered to site.

First oil achieved in the third quarter. Cenovus continues to monitor the pilot and reports it is on track to file its commercial application before year-end.

Cenovus and partner ConocoPhillips Canada anticipate a response from the ERCB regarding the Narrows Lake application in the second quarter of 2012.

Connacher says its SAGD+ (solvent) pilot project has been proceeding favourably with recorded evidence of attendant SOR reductions and a positive response in well productivity, while recovering a high percentage of the solvent. Regulatory approvals for expansion are expected in late 2011 or early 2012. JV process ongoing as planned—Connacher expects bids by year-end 2011.

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
CONOCOPHILLIPS CANADA LIMITED				
Surmont				

ConocoPhillips says it has received regulatory approval to increase production capacity of Phase 2 to 109,000 barrels per day, up from the previously approved 83,000 barrels per day.

Phase 1	27,000	2007	Operating	SAGD
Phase 2	109,000	2015	Construction	SAGD
Pilot	1,200	1997	Operating	SAGD
DEVON CANADA CORPORATION				
Jackfish				

Devon's Jackfish 3 project has been approved by Alberta regulators. Devon says that Jackfish 2 is ramping up ahead of schedule.

Phase 1	35,000	2007	Operating	SAGD
Phase 2	35,000	2011	Operating	SAGD
Phase 3	35,000	2015	Approved	SAGD
Pike				

Devon reports successful completion of 135 appraisal wells on its Pike lease, with results consistent with company expectations. Regulatory application anticipated for the first phase of the project in the first half of 2012.

1A	35,000	2017	Announced	SAGD
1B	35,000	2017	Announced	SAGD
1C	35,000	2017	Announced	SAGD
GRIZZLY OIL SANDS ULC				
Algar Lake				

Regulatory approvals in hand. Module fabrication for central processing facility underway.

Phase 1	5,650	2015	Construction	SAGD
Phase 2	5,650	2014	Approved	SAGD
HARVEST OPERATIONS CORP.				
BlackGold				

Harvest says first production will now be in 2014 rather than 2013. Near-term activities include completion of detailed engineering, site preparation and commencement of major equipment fabrication. Drilling of 15 well pairs is planned for 2012.

Phase 1	10,000	2013	Construction	SAGD
Phase 2	20,000	2014	Application	SAGD
HUSKY ENERGY INC.				
McMullen				

Facilites commissioning complete, steam injection (the first phase of the process) began in September.

Air Injection Pilot	755	2010	Construction	SAGD
JAPAN CANADA OIL SANDS LIMITED				
Hangingstone				

JACOS anticipates regulatory approval for Phase 1 expansion in the third quarter of 2011.

Expansion	35,000	2013	Application	SAGD
Hangingstone Pilot				

JACOS owner JAPEX says regulatory approval for expansion is anticipated this fall, and an investment decision will follow.

Pilot	11,000	2006	Operating	SAGD
LARICINA ENERGY LTD.				
Germain				

Civil site construction complete. Well pair drilling has commenced. Procurement, engineering and module fabrication continues. Laricina has commenced an expansion of its camp to support project construction. Work continues on regulatory application for expansions. Production is now expected in early 2015.

Phase 1 Commercial Demonstration	5,000	2015	Construction	SAGD
Phase 2	30,000	TBD	Application	SAGD
Phase 3	60,000	TBD	Application	
Phase 4	60,000	TBD	Application	

CURRENT PROJECT	CAPACITY	START-UP	REGULATORY STATUS	TECHNOLOGY
Saleski				

Laricina says the Saleski pilot has sold 26,300 barrels of bitumen as of the end of the third quarter. Pilot testing continues with an additional steam cycle added to each operating pair. The company has received regulator approval for the addition of a second steam generator. The Phase 1 application continues to move through the regulatory process, and now first steam is targeted for early 2014 rather than late 2013.

Phase 1	10,700	2013	Application	SAGD
Pilot	1,800	2011	Operating	SAGD
MEG ENERGY CORPORATION				
Christina Lake				

MEG says that production at Christina has quickly bounced back to capacity following a turnaround. It has completed the connections for two new steam generators and the tie-in of two infill wells and four new well pairs to existing oparations. Detailed engineering on Phase 2B is 84 per cent complete and construction 22 per cent complete, remaining on time and on budget.

Phase 1 Pilot	3,000	2006	Operating	SAGD
Phase 2A	22,000	2009	Operating	SAGD
Phase 2B	35,000	2012	Construction	SAGD
Phase 3A	50,000	2015	Application	SAGD
Phase 3B	50,000	2018	Application	SAGD
Phase 3C	50,000	2020	Application	SAGD
Surmont				
Phase 1	50,000	2018	Announced	SAGD
Phase 2	50,000	TBD	Announced	SAGD
N-SOLV CORPORATION				
Dover				

N-Solv and partner Suncor Energy have been granted funding from the Government of Canada under Sustainable Development Technology Canada to develop the N-Solv pilot.

Demonstration Plant	500	2014	Announced	N-SOLV
NEXEN INC.				
Long Lake				

Nexen says that production at Long Lake increased by six per cent in the third quarter and reached its highest quarterly volume to date (29,500 barrels per day). The increase is due to increased volumes from a new well pad as well as higher rates from some of the better-quality wells. Nexen anticipates exiting 2011 in the mid-30,000-barrel-per-day range.

Long Lake South (Kinosis) Phase 1	40,000	TBD	Approved	SAGD
Long Lake South (Kinosis) Phase 2	40,000	TBD	Approved	SAGD
Phase 1	72,000	2009	Operating	SAGD
Phase 2	72,000	TBD	Approved	SAGD
Phase 3	72,000	TBD	Application	SAGD
Phase 4	72,000	TBD	Announced	SAGD
PARAMOUNT RESOURCES LTD.				
Hoole				

Paramount is spinning off its oil sands assets, including Hoole and carbonate leases, into a new firm called Pixar Petroleum Corp. The company says the majority of work necessary for the Hoole regulatory application has been completed, together with preliminary front-end engineering and design, reservoir modelling and simulation.

Commercial	35,000	2015	Announced	SAGD
PETROBANK ENERGY AND RESOURCES LTD.				
Conklin (Whitesands)				
Expansion	1,900	TBD	On Hold	THAI
Pilot	1,900	2006	Suspended	THAI
May River				

The ERCB will hold a public hearing on the project in March 2012. Following the outcome of that hearing (expected within three months), Petrobank will update its development schedule and proceed with its internal approval processes.

Phase 1	10,000	2013	Application	THAI
Subsequent Phases	90,000	TBD	Disclosed	THAI
STATOIL				
Kai Kos Dehseh				
Corner	40,000	2015	Application	SAGD
Corner Expansion	40,000	TBD	Application	SAGD
Hangingstone	20,000	TBD	Application	SAGD
Leismer	20,000	2013	Application	SAGD

PROJECT	CAPACITY	START-UP	APPLICATION STATUS	TECHNOLOGY
Leismer Demonstration	18,750		Operating	SAGD
Leismer Expansion	20,000	TBD	Application	SAGD
Leismer Northwest	20,000	TBD	Application	SAGD
Leismer South	20,000	TBD	Application	SAGD
Thornbury	40,000	TBD	Application	SAGD
Thornbury Expansion	20,000		Application	SAGD
SUNCOR ENERGY INC.				
Chard				
Phase 1	40,000		Announced	SAGD
Meadow Creek				
Phase 1	40,000	TBD	Approved	SAGD
Phase 2	40,000	TBD	Approved	SAGD
VALUE CREATION INC.				
Triton				
Value Creation is providing the ERCB with additional information supporting its application.				
Pilot	1,000		Application	SAGD

COLD LAKE REGION — IN SITU
BITUMEN PRODUCTION CAPACITY

PROJECT	CAPACITY	START-UP	APPLICATION STATUS	TECHNOLOGY
CANADIAN NATURAL RESOURCES LIMITED				
Primrose/Wolf Lake				
Canadian Natural plans five new pads at Primrose East and three new pads at Primrose South in 2012.				
Primrose East	32,000		Operating	CSS
Primrose North	30,000		Operating	CSS
Primrose South	45,000		Operating	CSS
Wolf Lake	13,000		Operating	CSS
HUSKY ENERGY INC.				
Sunrise				
Demonstration	10,000		Approved	SAGD
Tucker				
Husky says that the "production remediation plan" for Tucker continues to be on track, exiting the third quarter at over 9,000 barrels per day, up from about 4,000 barrels per day the previous year.				
Phase 1	30,000		Operating	SAGD
IMPERIAL OIL LIMITED				
Cold Lake				
Cold Lake achieved production record of 162,000 barrels per day in the third quarter of 2011, due to contributions from new wells steamed in 2010 and 2011. Imperial continues to progress its cyclic solvent process technology. A three-horizontal-well-pair pilot has been sanctioned and is expected to start up in late 2013.				
Phase 1-10	110,000		Operating	CSS
Phase 11-13	30,000	2007	Operating	CSS
Phase 14-16	30,000	TBD	Approved	CSS
KOCH EXPLORATION CANADA CORPORATION				
Gemini				
The ERCB will hold a public hearing on the proposed Gemini project in Cold Lake on Feb. 22, 2012.				
Commercial	10,000		Application	SAGD
Pilot	1,200	2011	Application	SAGD
OSUM OIL SANDS CORP.				
Taiga				
Osum reports that regulatory approval is anticipated by early 2012.				
Phase 1	17,500		Application	SAGD
Phase 2	17,500	2015	Application	SAGD
PENGROWTH CORPORATION				
Lindbergh				
Surface engineering and procurement underway. Drilling of two SAGD well pairs has begun, with first steam planned for January 2012. Submission of regulatory application for commercial project anticipated in late 2011 or early 2012.				
Commercial	12,000		Announced	SAGD
Pilot	1,200		Approved	SAGD

PROJECT	CAPACITY	START-UP	APPLICATION STATUS	TECHNOLOGY
ROYAL DUTCH SHELL PLC				
Orion				
Phase 1	10,000	2007	Operating	SAGD
Phase 2	10,000		Approved	SAGD

PEACE RIVER REGION — IN SITU
BITUMEN PRODUCTION CAPACITY

PROJECT	CAPACITY	START-UP	APPLICATION STATUS	TECHNOLOGY
ANDORA ENERGY CORPORATION				
Seven Lakes				
Andora Energy majority owner PanOrient Energy Corp. says the previously announced strategic review continues, but that no bids have been received to either purchase the company or farm into the asset. The process continues.				
SAGD Demonstration	1,400		Approved	SAGD
NORTHERN ALBERTA OIL LTD.				
Sawn Lake				
CSS Pilot	700	TBD	Approved	CSS
PETROBANK ENERGY AND RESOURCES LTD.				
Dawson				
Field work and drilling underway. Petrobank says it has drilled and completed two horizontal production wells and one vertical injection well on time and on budget, with the second to be completed by year-end 2011. Relocated surface facilities are ready to be installed. Pre-ignition heating cycle is expected to start before year-end with air injection underway in early 2012. Regulatory applications for commercial project to be filed by the end of the year.				
Phase 2	10,000		Announced	THAI
THAI Demonstration	TBD		Approved	THAI
ROYAL DUTCH SHELL PLC				
Peace River				
Cadotte Lake	12,500		Operating	CSS
Carmon Creek - Phase 1	40,000	2016	Announced	CSS
Carmon Creek - Phase 2	40,000	TBD	Announced	CSS
SOUTHERN PACIFIC RESOURCE CORP.				
Red Earth				
Southern Pacific re-activated the project earlier this year and is currently testing three different wellbores with different CSS configurations. Testing will continue through 2012.				
Commercial	10,000		Announced	CSS
Pilot	1,000	2008	Operating	CSS
Pilot Expansion	3,000	TBD	Announced	CSS

NORTH ATHABASCA REGION — UPGRADER
SYNTHETIC CRUDE OIL PRODUCTION CAPACITY

PROJECT	CAPACITY	START-UP	APPLICATION STATUS	TECHNOLOGY
CANADIAN NATURAL RESOURCES LIMITED				
Horizon				
Canadian Natural says that SCO production safely resumed (post-January upgrader fire) in August, steadily growing to 108,000 barrels per day in October. Commissioning is underway on a third ore preparation plant and associated hydrotransport, expected to increase reliability in 2012.				
Phase 1	114,000		Operating	Mining
Tranche 1	—		Complete	Engineering/Design
Tranche 2	5,000	2012	Construction	Mining
Phase 2A	10,000	2014	Approved	Mining
Phase 2B	45,000	TBD	Approved	Mining
Phase 3	80,000	TBD	Approved	Mining
IVANHOE ENERGY INC.				
Tamarack				
Ivanhoe says that Alberta regulators have completed their initial review of the project application. Answers to first round of supplemental information requests are being prepared, to be delivered to regulators in the fourth quarter of 2011. Project sanction remains subject to regulatory approval and financing.				
Phase 1	34,784		Application	Upgrader

CURRENT PROJECT	CAPACITY	START-UP	APPROVAL STATUS	TECHNOLOGY
SUNCOR ENERGY INC.				
Base Operations				

Suncor says that during the third quarter it completed construction and initiated commissioning of the hydrogen plant portion of the Millennium Naphtha Unit, and that the hydrotreater portion of the project is expected to be completed before the end of 2011. This project is designed to provide flexibility and boost sweet oil production, helping to maximize profits. Suncor is also in the process of deploying TRO tailings management across its operations, to be completed by the fourth quarter of 2012.

Millennium Coker Unit	97,000	[illegible]	Operating	Upgrader
Millennium Vacuum Unit	35,000	2005	Operating	Upgrader
U1 and U2	225,000	1967	Operating	Upgrader
Fort Hills				

Current capital expenditures for Fort Hills are around design-base memorandum engineering.

Phase 1	145,000	[illegible]	Approved	Upgrader
Phase 2 & 3	145,000	TBD	Approved	Upgrader
Voyageur Upgrader 3				

Current capital expenditures are around remobilizing the workforce, confirmation of current design and modification of project execution plans.

Phase 1	127,000	[illegible]	Approved	Upgrader
Phase 2	63,000	TBD	Approved	Upgrader
SYNCRUDE CANADA LTD.				
Mildred Lake/Aurora North & South				

Canadian Oil Sands reports that front-end engineering and design are now complete for its $4.6-billion Mildred Lake mine train replacements. The target in-service date for the $1.6-billion Syncrude Emissions Reduction Project has now been extended into the first quarter of 2012.

Base Plant Stage 1 & 2 Debottlenecking	250,000	1978	Operating	Upgrader
Stage 3 Debottlenecking	75,000	TBD	Announced	Upgrader
Stage 3 Expansion (UE-1)	100,000	2006	Operating	Upgrader
VALUE CREATION INC.				
Terre de Grace				
Phase 1	33,600	TBD	Application	Upgrader
Phase 2	33,600	TBD	Application	Upgrader
Pilot	8,400	[illegible]	Approved	Upgrader

SOUTH ATHABASCA REGION — UPGRADER
SYNTHETIC CRUDE OIL PRODUCTION CAPACITY

NEXEN INC.				
Long Lake				

Nexen says that production at Long Lake increased by six per cent in the third quarter and reached its highest quarterly volume to date (29,500 barrels per day). The increase is due to increased volumes from a new well pad as well as higher rates from some of the better-quality wells. Nexen anticipates exiting 2011 in the mid-30,000-barrel-per-day range.

Phase 1	58,500	[illegible]	Operating	Upgrader
Phase 2	58,500	TBD	Approved	Upgrader
Phase 3	58,500	TBD	Announced	Upgrader
Phase 4	58,500	TBD	Announced	Upgrader
VALUE CREATION INC.				
Triple				

Value Creation is providing the ERCB with additional information supporting its application.

Pilot	840	[illegible]	Application	Upgrader

CURRENT PROJECT	CAPACITY	START-UP	APPROVAL STATUS	TECHNOLOGY

INDUSTRIAL HEARTLAND REGION — UPGRADER
SYNTHETIC CRUDE OIL PRODUCTION CAPACITY

NORTH WEST UPGRADING INC.				
Redwater Upgrader				

Final sanction anticipated late this year or early 2012. Alberta's Industrial Heartland Association expects to see activity ramping up this fall, including moving project management trailers onto the site, improvements to the approaches to the site and some site grading.

Phase 1	77,000	2015	Approved	Upgrader
Phase 2	77,000	2016	Approved	Upgrader
Phase 3	77,000	TBD	Approved	Upgrader
SHELL ALBIAN SANDS				
Scotford Upgrader 1				

First commercial production from Scotford upgrader expansion announced in May 2011. Engineers will now focus on improving operating efficiencies and adding capacity through debottlenecking.

Commercial	158,000	2003	Operating	Upgrader
Expansion	91,000	2008	Operating	Upgrader
Scotford Upgrader 2				

Shell withdrew its application for all phases of Scotford Upgrader 2 in fall 2010.

Phase 1	97,750	[illegible]	Cancelled	Upgrader
Phase 2	97,750	TBD	Cancelled	Upgrader
Phase 3	97,750	TBD	Cancelled	Upgrader
Phase 4	97,750	TBD	Cancelled	Upgrader
STATOIL				
Strathcona				

Application withdrawn in December 2008.

Phase 1	65,000	[illegible]	Cancelled	Upgrader
Phase 2	152,000	TBD	Cancelled	Upgrader
TOTAL E&P CANADA LTD.				
Northern Lights				

Previous project owner Synenco Energy withdrew the Northern Lights upgrader application in June 2008. Total purchased Synenco in August 2008.

Phase 1	50,600	[illegible]	Cancelled	Upgrader
Phase 2	50,600	TBD	Cancelled	Upgrader
Strathcona				

Total says it will not proceed with its Strathcona upgrader.

Debottlenecking	46,000	TBD	Cancelled	Upgrader
Phase 1	138,000	TBD	Cancelled	Upgrader
Phase 2	87,000	TBD	Cancelled	Upgrader
VALUE CREATION INC.				
Heartland				

Construction suspended in September 2008.

Phase 1	46,300	[illegible]	On Hold	Upgrader
Phase 2	46,300	TBD	Approved	Upgrader
Phase 3	46,300	TBD	Approved	Upgrader

Glossary of oil sands terms

API

An American Petroleum Institute measure of liquid gravity. Water is 10 degrees API, and a typical light crude is from 35 to 40. Bitumen is 7.5 to 8.5.

Barrel

The traditional measurement for crude oil volumes. One barrel equals 42 U.S. gallons (159 litres). There are 6.29 barrels in one cubic metre of oil.

Bitumen

Naturally occurring, viscous mixture of hydrocarbons that contains high levels of sulphur and nitrogen compounds. In its natural state, it is not recoverable at a commercial rate through a well because it is too thick to flow. Bitumen typically makes up about 10 per cent by weight of oil sand, but saturation varies.

Condensate

Mixture of extremely light hydrocarbons recoverable from gas reservoirs. Condensate is also referred to as a natural gas liquid, and is used as a diluent to reduce bitumen viscosity for pipeline transportation.

Cyclic steam stimulation (CSS)

For several weeks, high-pressure steam is injected into the formation to soften the oil sand before being pumped to the surface for separation. The pressure created in the underground environment causes formation cracks that help move the bitumen to producing wells. After a portion of the reservoir has been saturated, the steam is turned off and the reservoir is allowed to soak for several weeks. Then the production phase brings the bitumen to the surface.

Density

The heaviness of crude oil, indicating the proportion of large, carbon-rich molecules, generally measured in kilograms per cubic metre (kg/m^3) or degrees on the American Petroleum Institute (API) gravity scale; in western Canada, oil up to 900 kg/m^3 is considered light-to-medium crude—oil above this density is deemed as heavy oil or bitumen.

Diluent

See *Condensate*

Established recoverable reserves

Reserves recoverable under current technology and present and anticipated economic conditions, plus that portion of recoverable reserves that is interpreted to exist, based on geological, geophysical or similar information, with reasonable certainty.

Established reserves

Reserves recoverable with current technology and present and anticipated economic conditions specifically proved by drilling, testing or production, plus the portion of contiguous recoverable reserves that are interpreted to exist from geological, geophysical or similar information with reasonable certainty.

Extraction

A process, unique to the oil sands industry, which separates the bitumen from the oil sand using hot water, steam and caustic soda.

Froth treatment

The means to recover bitumen from the mixture of water, bitumen and solids "froth" produced in hot-water extraction (in mining-based recovery).

Gasification

A process to partially oxidize any hydrocarbon, typically heavy residues, to a mixture of hydrogen and carbon monoxide. Can be used to produce hydrogen and various energy byproducts.

Greenhouse gases

Gases commonly believed to be connected to climate change and global warming. CO_2 is the most common, but greenhouse gases also include other light hydrocarbons (such as methane) and nitrous oxide.

Initial established reserves

Established reserves prior to the deduction of any production.

Initial volume in place

The volume calculated or interpreted to exist in a reservoir before any volume has been produced.

In situ

Latin for "in place." In situ recovery refers to various methods used to recover deeply buried bitumen deposits.

In situ combustion

A displacement enhanced oil recovery method. It works by generating combustion gases (primarily CO and CO_2) downhole, which then "pushes" the oil towards the recovery well.

Lease

A legal document from the province of Alberta giving an operator the right to extract bitumen from the oil sand existing within the specified lease area. The land must be reclaimed and returned to the Crown at the end of operations.

Muskeg

A water-soaked layer of decaying plant material, one to three metres thick, found on top of the overburden.

Oil sands

Bitumen-soaked sand, located in four geographic regions of Alberta: Athabasca, Wabasca, Cold Lake and Peace River. The Athabasca deposit is the largest, encompassing more than 42,340 square kilometres. Total deposits of bitumen in Alberta are estimated at 1.7 trillion to 2.5 trillion barrels.

Overburden

A layer of sand, gravel and shale between the surface and the underlying oil sand. Must be removed before oil sands can be mined. Overburden underlies muskeg in many places.

Pilot plant

Small model plant for testing processes under actual production conditions.

Proven recoverable reserves

Reserves that have been proven through production or testing to be recoverable with existing technology and under present economic conditions.

Reclamation

Returning disturbed land to a stable, biologically productive state. Reclaimed property is returned to the province of Alberta at the end of operations.

Remaining established reserves

Initial reserves less cumulative production.

Royalty

The Crown's share of production or revenue. About three-quarters of Canadian crude oil is produced from lands, including the oil sands, on which the Crown holds mineral rights. The lease or permit between the developer and the Crown sets out the arrangements for sharing the risks and rewards.

Steam assisted gravity drainage (SAGD)

An in situ production process using two closely spaced horizontal wells: one for steam injection and the other for production of the bitumen/water emulsion.

Synthetic crude oil (SCO)

A manufactured crude oil comprised of naphtha, distillate and gas oil-boiling range material. Can range from high-quality, light sweet bottomless crude to heavy, sour blends.

Tailings

A combination of water, sand, silt and fine clay particles that are a byproduct of removing the bitumen from the oil sand.

Tailings settling basin

The primary purpose of the tailings settling basin is to serve as a process vessel allowing time for tailings water to clarify and silt and clay particles to settle, so the water can be reused in extraction. The settling basin also acts as a thickener, preparing mature fine tails for final reclamation.

Thermal recovery

Any process by which heat energy is used to reduce the viscosity of bitumen in situ to facilitate recovery.

Toe to heel air injection (THAI)

An in situ combustion method for producing heavy oil and oil sand. In this technique, combustion starts from a vertical well, while the oil is produced from a horizontal well having its toe in close proximity to the vertical air-injection well. This production method is a modification of conventional fire flooding techniques in which the flame front from a vertical well pushes the oil to be produced from another vertical well.

Truck-and-shovel mining

Large electric or hydraulic shovels are used to remove the oil sand and load very large trucks. The trucks haul the oil sand to dump pockets where it is conveyed or pipelined to the extraction plant. Trucks and shovels are more economic to operate than the bucket-wheel reclaimers and draglines they have replaced at oil sands mines.

Upgrading

The process of converting heavy oil or bitumen into synthetic crude either through the removal of carbon (coking) or the addition of hydrogen (hydroconversion).

Vapour extraction (VAPEX)

VAPEX is a non-thermal recovery method that involves injecting a gaseous hydrocarbon solvent into the reservoir where it dissolves into the sludge-like oil, which becomes less viscous (or more fluid) before draining into a lower horizontal well and being extracted.

Viscosity

The ability of a liquid to flow. The lower the viscosity, the more easily the liquid will flow.

CONTACTS

Oil Sands Producers

Alberta Oilsands	www.aboilsands.ca
Andora Energy	www.andoraenergy.com
Athabasca Oil Sands	www.aosc.com
Baytex Energy	www.baytex.ab.ca
BlackPearl Resources	www.blackpearlresources.ca
Canadian Natural Resources	www.cnrl.com
Canovus Energy	www.cenovus.com
Chevron Canada	www.chevron.ca
China National Offshore Oil Corporation	www.cnoocltd.com
Connacher Oil and Gas	www.connacheroil.com
ConocoPhillips Canada	www.conocophillips.ca
Devon Canada	www.dvn.com
Dover Operating Corp.	www.doveropco.com
Enerplus Resources Fund	www.enerplus.com
E-T Energy	www.e-tenergy.com
Grizzly Oil Sands	www.grizzlyoilsands.com
Harvest Operations Corp.	www.harvestenergy.ca
Husky Energy	www.huskyenergy.ca
Imperial Oil	www.imperialoil.ca
Ivanhoe Energy	www.ivanhoe-energy.com
Japan Canada Oil Sands	www.jacos.com
Koch Exploration Canada	www.kochind.com
Korea National Oil Corporation	www.knoc.co.kr
Laricina Energy	www.laricinaenergy.com
Marathon Oil	www.marathon.com
MEG Energy	www.megenergy.com
Nexen	www.nexeninc.com
North West Upgrading	www.northwestupgrading.com
N-Solv	www.n-solv.com
Oak Point Energy	www.oakpointenergy.ca
Occidental Petroleum Corporation	www.oxy.com
Oilsands Quest	www.oilsandsquest.com
OSUM Oil Sands	www.osumcorp.com
Pan Orient Energy	www.panorient.ca
Paramount Resources Ltd.	www.paramountres.com
Pengrowth Energy Trust	www.pengrowth.com
Petrobank Energy and Resources	www.petrobank.com
PetroChina	www.petrochina.com
Shell Canada	www.shell.ca
SilverBirch Energy	www.silverbirchenergy.com
Sinopec	www.english.sinopec.com
Southern Pacific Resource Corp.	www.shpacific.com
Statoil Canada	www.statoil.com
Suncor Energy	www.suncor.com
Sunshine Oilsands	www.sunshineoilsands.com
Syncrude	www.syncrude.ca
Talisman Energy	www.talisman-energy.com
Teck Resources	www.teck.com
Total E&P Canada	www.total-ep-canada.com
Value Creation Group	www.vctek.com

Associations/Organizations

Alberta Building Trades Council	www.albertabuildingtrades.com
Alberta Chamber of Resources	www.acr-alberta.com
Alberta Chambers of Commerce	www.abchamber.ca
Alberta Energy	www.energy.gov.ab.ca
Alberta Environment and Water	www.environment.alberta.ca
Alberta Treasury Board and Enterprise	www.treasuryboard.alberta.ca
Alberta Innovates	www.albertainnovates.ca
Alberta's Industrial Heartland Association	www.industrialheartland.com
Canadian Association of Geophysical Contractors	www.cagc.ca
Canadian Association of Petroleum Producers	www.capp.ca
Canadian Heavy Oil Association	www.choa.ab.ca
Canadian Oil Sands Network for Research and Development	www.conrad.ab.ca
Energy Resources Conservation Board	www.ercb.ca
In Situ Oil Sands Alliance	www.iosa.ca
Lakeland Industry and Community Association	www.lica.ca
Natural Resources Conservation Board	www.nrcb.gov.ab.ca
Oil Sands Developers Group	www.oilsandsdevelopers.ca
Oil Sands Leadership Initiative	www.osli.ca
Oil Sands Secretariat	www.treasuryboard.alberta.ca
Petroleum Technology Alliance Canada	www.ptac.org

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CONTACTS

Oil Sands Producers

Alberta Oilsands	www.aboilsands.ca
Andora Energy	www.andoraenergy.com
Athabasca Oil Sands	www.aosc.com
Baytex Energy	www.baytex.ab.ca
BlackPearl Resources	www.blackpearlresources.ca
Canadian Natural Resources	www.cnrl.com
Canovus Energy	www.cenovus.com
Chevron Canada	www.chevron.ca
China National Offshore Oil Corporation	www.cnoocltd.com
Connacher Oil and Gas	www.connacheroil.com
ConocoPhillips Canada	www.conocophillips.ca
Devon Canada	www.dvn.com
Dover Operating Corp.	www.doveropco.com
Enerplus Resources Fund	www.enerplus.com
E-T Energy	www.e-tenergy.com
Grizzly Oil Sands	www.grizzlyoilsands.com
Harvest Operations Corp.	www.harvestenergy.ca
Husky Energy	www.huskyenergy.ca
Imperial Oil	www.imperialoil.ca
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Koch Exploration Canada	www.kochind.com
Korea National Oil Corporation	www.knoc.co.kr
Laricina Energy	www.laricinaenergy.com
Marathon Oil	www.marathon.com
MEG Energy	www.megenergy.com
Nexen	www.nexeninc.com
North West Upgrading	www.northwestupgrading.com
N-Solv	www.n-solv.com
Oak Point Energy	www.oakpointenergy.ca
Occidental Petroleum Corporation	www.oxy.com
Oilsands Quest	www.oilsandsquest.com
OSUM Oil Sands	www.osumcorp.com
Pan Orient Energy	www.panorient.ca
Paramount Resources Ltd.	www.paramountres.com
Pengrowth Energy Trust	www.pengrowth.com
Petrobank Energy and Resources	www.petrobank.com
PetroChina	www.petrochina.com
Shell Canada	www.shell.ca
SilverBirch Energy	www.silverbirchenergy.com
Sinopec	www.english.sinopec.com
Southern Pacific Resource Corp.	www.shpacific.com
Statoil Canada	www.statoil.com
Suncor Energy	www.suncor.com
Sunshine Oilsands	www.sunshineoilsands.com
Syncrude	www.syncrude.ca
Talisman Energy	www.talisman-energy.com
Teck Resources	www.teck.com
Total E&P Canada	www.total-ep-canada.com
Value Creation Group	www.vctek.com

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Alberta Chamber of Resources	www.acr-alberta.com
Alberta Chambers of Commerce	www.abchamber.ca
Alberta Energy	www.energy.gov.ab.ca
Alberta Environment and Water	www.environment.alberta.ca
Alberta Treasury Board and Enterprise	www.treasuryboard.alberta.ca
Alberta Innovates	www.albertainnovates.ca
Alberta's Industrial Heartland Association	www.industrialheartland.com
Canadian Association of Geophysical Contractors	www.cagc.ca
Canadian Association of Petroleum Producers	www.capp.ca
Canadian Heavy Oil Association	www.choa.ab.ca
Canadian Oil Sands Network for Research and Development	www.conrad.ab.ca
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In Situ Oil Sands Alliance	www.iosa.ca
Lakeland Industry and Community Association	www.lica.ca
Natural Resources Conservation Board	www.nrcb.gov.ab.ca
Oil Sands Developers Group	www.oilsandsdevelopers.ca
Oil Sands Leadership Initiative	www.osli.ca
Oil Sands Secretariat	www.treasuryboard.alberta.ca
Petroleum Technology Alliance Canada	www.ptac.org

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